



## Civil Aviation Authority DofE Skill Activity – Bronze Award

<b>Skills</b> section planned start date:	DD/MM/2023 – duration <b>3</b> months
Type and details of activity:	Science & Technology, Radio Signals
Where are you going to do it:	Civil Aviation Authority (CAA)
Example of personal goals applicant could achieve:	To learn more about radio signals and enhance my experience as part of being in the Signals Platoon
Skill Assessor Name:	Stuart Rankin
Assessor Job Title:	Policy Principal CNSS & Spectrum
Contact Email:	<a href="mailto:dofe@caa.co.uk">dofe@caa.co.uk</a>

Help and support for this program may also be provided through our STEM team at the CAA [stem@caa.co.uk](mailto:stem@caa.co.uk).


The below is a series of signposts of work that can be undertaken in any order. Please complete a diary log which includes the reference number and how long you took in minutes. Remember to successfully complete the activity you need to evidence a minimum of one hour per week, continuously for three months (about 13 weeks). The tasks can be broken up, so you do not have to finish in one day – if they are more than 60 minutes then cover the task over two weeks.

Item	Activity	Estimated duration*	Details – web links are signpost to guide you. You may source your own.	Task Output – please ensure you reference your sources
*Note: The timings are a guide so please ensure you make note of your own timings and write those durations down – stick to one hour per week – therefore one activity may take you more than one week to complete. This will help provide feedback and adjust this programme.				
1	NATO Phonetic Alphabet	30 minutes	<b>NATO Phonetic Alphabet</b> Learn the NATO phonetic alphabet and learn to spell your name using phonetics <a href="#">Phonetic Alphabet   The NATO Phonetic Alphabet For Teaching - Bing video</a>	Using the NATO phonetics, type out your name and / or record either a video or a sound clip saying your name
2	Discovery of the Radio	Research: 30 minutes Activity output: 30 minutes	<b>Discovery of Radio</b> Learn about the discovery and development of radio, including different technologies. For example, FM Radio, TV, Digital, WiFi A number of example resources below. Please do not copy & paste. <a href="#">Introduction - Radio - GCSE Media Studies Revision - BBC Bitesize radio - Students   Britannica Kids   Homework Help</a> <a href="#">Who Really Invented the Radio? - Bing video</a>	<ol style="list-style-type: none"> <li>1. Develop in your own words (typed or handwritten) a timeline of the invention of radio.</li> <li>2. List your references used</li> <li>3. Highlight milestones</li> </ol>
3	Morse code – part 1	Research: 15 minutes Activity output: 15 minutes	<b>Morse Code – Part 1</b> Investigate the origin of morse code and the morse code alphabet.	Either handwritten or typed, in your own words right a short essay on what you learnt.
4	Morse code – part 2	15 minutes	<b>Morse Code – Part 2</b> Using morse code, learn to code your full name <a href="#">Morse Code Translator   Morse Decoder</a>	Type out your name in morse code either in Word document or on paper.
5	Morse Code – Part 3	60 minutes	<b>Morse Code – Part 3</b> Practical ability – write a message to be translated by your Assessor or link up with a friend and send messages to each other using a torch or light. Using one of the many morse code aps available for Android and iphone: App ‘Morse Code Keyer’ App ‘Morse Code Telegraph Keyer’ App ‘Morse Keyer’	Record a video presentation. If using the app, take screen shots.



Item Activity Estimated duration\* Details – web links are signpost to guide you. You may source your own. ensure you reference your sources Task Output – please Name

\*Note: The timings are a guide so please ensure you make note of your own timings and write those durations down – stick to one hour per week – therefore one activity may take you more than one week to complete. This will help provide feedback and adjust this programme.

6	Frequencies (Multiple stages to be undertaken for this task)	60-90 minutes	<p><b>Learning Frequencies</b></p> <ol style="list-style-type: none"> <li>Track through a FM radio and note down the operational frequency. You could use a phone, car stereo, portable wireless radio.</li> <li>Provide a 'signal strength and readability report' for each station you can receive. <i>Link with more details provided below.</i></li> <li>Investigate how you can improve reception. Try different rooms in the house, being outside or different locations such as the top of hills. Ensure to note down your locations.</li> </ol> <p><a href="#">Signal strength and readability report - HandWiki</a></p>	<p>Please undertake each element of this task and clearly detail:</p> <p>Create a list of FM and AM radio stations you can receive. Include the name, operational frequency and signal strength/readability report. To create the list you may use word, excel, powerpoint or video recording if you prefer to speak.</p> <p>Create a second list using a different location and see if there are more or less available stations, or if the quality of signal has improved.</p> <p>Describe the change that has been made, e.g higher ground, different room, closer to window etc.</p>
7	Radio Survey	90 minutes	<p><b>Transmitter Survey</b></p> <p>Put your map reading skills into practice with this one. Ask to borrow a local OS map (available from most libraries) or use Microsoft Bing maps. (see <a href="#">OS Maps on Bing - Internet Geography</a>)</p> <p>Using a map of your local area, source the locations of live stations. Try to identify the frequency the radio systems operate on.</p> <p>Radio masts are typically indicated on an OS map using the symbol below, these will be larger masts such as TV or radio transmitters.</p>  <p>This might include different technologies such as mobile phone, tv masts etc. You can look up TV and Radio antennas here: <a href="#">Check transmitter faults   Help receiving TV and radio (bbc.co.uk)</a></p> <p>You can also use mobile phone network coverage checkers to see where masts are located.</p> <p><a href="#">O2 Network Coverage Checker   2G, 3G, 4G and 5G Coverage</a></p> <p><a href="#">Radio Frequency Spectrum (Radio Frequency Chart) - Electronics Desk</a></p>	<p>Draw a map of your local area and indicate the radio systems that are in use and their location.</p> <p>Provide true OS 6-figure grid references – <i>do not make up your own</i>. 6figure grid reference and map symbols are one star map &amp; compass (navigation) subjects, you will need this knowledge for your Bronze expedition (equivalent to 2* Exped).</p> <p>From your OS map include a height the station is installed. For example on top of a hill.</p>



Item	Activity	Estimated duration*	Details – web links are signpost to guide you. You may source your own.	Task Output – please ensure you reference your sources	Name
<p>*Note: The timings are a guide so please ensure you make note of your own timings and write those durations down – stick to one hour per week – therefore one activity may take you more than one week to complete. This will help provide feedback and adjust this programme.</p>					
			<a href="#">Radio Frequency List - How the Radio Spectrum Works</a>   <a href="#">HowStuffWorks</a>		
8	Looking at Antennas	120 minutes	<p><b>Looking at Antennas</b></p> <p>Identify different antennas around and outside your home. Take a photo of the antenna or device and keep a log of its location (6-figure grid reference, what3words or description).</p> <p>This could include TV aerials, satellite dishes etc. It might also include devices where you cannot see the antenna, such as wireless buttons, wifi devices etc. Consider devices that are wireless and how they might work.</p>	Create a wireless equipment site log including picture, locations, what it is doing and the frequency of operation.	
9	Build a radio	120 minutes	<p><b>Build a radio</b></p> <p>Build a crystal set radio.</p> <p><a href="#">Radio Electronic DIY Kit 7 Tube Radio Electronic Learning Set : Amazon.co.uk: Toys &amp; Games</a></p>	<p>Buy a crystal radio. Build the radio taking photos as you go along.</p> <p>Do a small video of using the built radio.</p> <p><i>Note: as there is a cost element to this activity, remember it is not mandatory.</i></p>	
10	Go Global	120 – 240 minutes	<p>Using a long wave and/or shortwave radio, see what radio stations you can pick up and build a global map of the transmission origin. Use the internet to research the station and where it is based.</p> <p><a href="#">TECSUN R-9012 Portable Digital Shortwave Radio AM/FM/SW(1-10) 12 Bands Receiver Receiver(UK9012): Amazon.co.uk: Electronics &amp; Photo</a></p> <p><a href="#">MWLIST quick and easy: Europe, Africa and Middle East</a></p> <p><a href="#">Your Ultimate Shortwave Radio Station List (Worldwide) – Radio Fidelity</a></p>		
11	Activity programme Feedback	60 minutes – depending on level of detail given.	<p><b>Provide feedback to Assessor of this activity</b></p> <p>Produce a report or record a video of your feedback of each task.</p>	To be emailed or arrange a virtual meeting.	
12	Presentation	120 minutes – 240 minutes	<p><b>Compose a presentation covering what you have learned and your activities. Deliver the presentation to a school class, friendship group or other club.</b></p>	PowerPoint presentation or similar.	

**Other:** remember you can also add your own pieces of research and work related to this topic as part of your aim especially if you need to demonstrate further hours to meet the criteria of work effort.